Amendment to the Claims

1. (Currently amended) A processing container for electrochemically processing a microelectronic workpiece comprising:

a principal fluid flow chamber;

a plurality of concentric anodes disposed ~~at different elevations~~ in the principal fluid flow chamber, the concentric anodes being independently coupled to a power supply ~~so as to place the concentric anodes at different distances from a microelectronic workpiece under process~~; and

a controller operatively coupled to the concentric anodes, the controller having a computer operable medium including instructions that cause unique electric currents to be applied concurrently to different ~~configured to deliver through each of the~~ concentric anodes ~~a current that is (a) based upon a current delivered through the concentric anode to process an earlier processed microelectronic workpiece and (b) selected to produce a more uniform processing of~~ while the workpiece is under process ~~than the processing of the earlier processed microelectronic workpiece~~.

2. (Currently amended) The processing container of claim 1 wherein the plurality of concentric anodes are contained within dielectric compartments ~~arranged at increasing distances from the microelectronic workpiece from an outermost one of the plurality of concentric anodes to an innermost one of the plurality of concentric anodes~~.

3. (Currently amended) The processing container of claim 2 wherein the principal fluid flow chamber is defined by a curved sidewall ~~at an upper portion thereof by an angled wall, the angled wall supporting one or more of the plurality of concentric anodes~~.

4. (Currently amended) The processing container of claim 1, further comprising a plurality of dielectric anode compartments having lateral projections at an

upper end of the compartments, the concentric anodes being housed in corresponding compartments, and the lateral projections shielding the workpiece from the concentric anodes to define a plurality of concentric virtual anodes~~wherein one or more of the plurality of concentric anodes is a virtual anode~~.

5. (Currently amended) The processing container of claim 41, further comprising a ~~wherein the~~ virtual anode ~~comprises~~including:

an anode chamber housing having a processing fluid inlet and a processing fluid outlet, the processing fluid outlet being disposed in close proximity to the microelectronic workpiece under process; and

at least one conductive anode element disposed in the anode chamber housing.

6. (Original) The processing container of claim 4 wherein the at least one conductive anode element is formed from an inert material.

7. (Original) The processing container of claim 1 and further comprising a plurality of nozzles disposed to provide a flow of the electrochemical processing fluid to the principal fluid flow chamber, the plurality of nozzles being arranged and directed to provide vertical and radial fluid flow components that combine to generate a substantially uniform normal flow component radially across the at least one surface of the workpiece.

8. (Original) The processing container of claim 1 wherein the principal fluid flow chamber is defined at an upper portion thereof by an angled wall, the angled wall supporting one or more of the plurality of concentric anodes.

9. (Original) The processing container of claim 1 wherein the principal fluid flow chamber further comprises an inlet disposed at a lower portion thereof that is configured to provide a Venturi effect that facilitates recirculation of processing fluid flow in a lower portion of the principal fluid flow chamber.

10. (Currently amended) The processing container of claim 1, wherein the controller further ~~comprising~~ comprises a current optimization subsystem for selecting the currents delivered through the concentric anodes by the controller.

11. (Original) The processing container of claim 10, further comprising a memory containing a Jacobian sensitivity matrix reflecting characteristics of the principal fluid flow chamber used by the current optimization subsystem in selecting the currents delivered through the concentric anodes by the controller.

12. (Original) The processing container of claim 1, further comprising a pump for circulating processing fluid within the principal flow chamber.

13. (Original) The processing container of claim 1 wherein the fluid flow chamber is adapted to contain an electrolyte solution for electroplating the microelectronic workpiece.

14. (Currently amended) The processing container of claim 13 wherein the current delivered by the controller to each anode is selected to produce a more uniform layer of electroplated material on the microelectronic workpiece under process than was produced on ~~the~~ an earlier-processed microelectronic workpiece.

15.–22. (Canceled)

23. (Original) A reactor for electrochemically processing a microelectronic workpiece comprising:

a principal fluid flow chamber;

a plurality of electrodes disposed in the principal fluid flow chamber;

a workpiece holder positioned to hold at least one surface of the microelectronic workpiece in contact with an electrochemical processing fluid in the principal fluid flow chamber at least during electrochemical processing of the microelectronic workpiece;

one or more electrical contacts connected to electrically contact the at least one surface of the microelectronic workpiece;

an electrical power supply connected to the one or more electrical contacts and to the plurality of electrodes, at least two of the plurality of electrodes being independently connected to the electrical power supply to facilitate independent supply of power thereto;

a control system connected to the electrical power supply to control at least one electrical power parameter respectively associated with each of the independently connected electrodes, the control system setting the at least one electrical power parameter for a given one of the independently connected electrodes based on one or more user input parameters and a plurality of predetermined sensitivity values, the predetermined sensitivity values corresponding to process perturbations resulting from perturbations of the electrical power parameter for the given one of the independently connected electrodes.

24. (Original) A reactor as claimed in claim 23 wherein the at least one electrical parameter is electrical current.

25. (Original) A reactor as claimed in claim 23 wherein the sensitivity values are logically arranged within the control system as one or more Jacobian matrices.

26. (Original) A reactor as claimed in claim 23 wherein the at least one user input parameter comprises the thickness of a film that is to be electrochemically deposited on the at least one surface of the microelectronic workpiece.

27. (Original) A reactor as claimed in claim 23 wherein at least two of the independently connected electrodes are disposed at different effective distances from the surface of the microelectronic workpiece.

28. (Original) A reactor as claimed in claim 23 wherein the independently connected electrodes are arranged concentrically with respect to one another.

29. (Original) A reactor as claimed in claim 23 wherein the independently connected electrodes are disposed at the same effective distance from the at least one surface of the microelectronic workpiece.

30. (Original) A reactor as claimed in claim 29 wherein the independently connected electrodes are arranged concentrically with respect to one another.

31. (Original) A reactor as claimed in claim 27 wherein the independently connected electrodes are arranged concentrically with respect to one another.

32. (Original) A reactor as claimed in claim 31 wherein the independently connected electrodes are arranged at increasing distances from the at least one surface of the microelectronic workpiece from an outermost one of the plurality of concentric anodes to an innermost one of the independently connected electrodes.

33. (Original) A reactor as claimed in claim 23 wherein one or more of the independently connected electrodes is a virtual electrode.

34. (Original) A reactor as claimed in claim 33 wherein the virtual electrode comprises:

an electrode chamber housing having a processing fluid inlet and a processing fluid outlet, the processing fluid outlet being disposed in close proximity to the microelectronic workpiece under process;

at least one conductive electrode element disposed in the electrode chamber housing.

35. (Original) A processing container as claimed in claim 34 wherein the at least one conductive electrode element is formed from an inert material.

36. (Original) A processing container as claimed in claim 23 and further comprising a plurality of nozzles disposed to provide a flow of the electrochemical processing fluid to the principal fluid flow chamber, the plurality of nozzles being arranged and directed to provide vertical and radial fluid flow components that combine to generate a substantially uniform normal flow component radially across the at least one surface of the workpiece.

37. (Original) A reactor for immersion processing at least one surface of a microelectronic workpiece, the reactor comprising:

a reactor head including a workpiece support;

one or more electrical contacts disposed on the workpiece support and positioned thereon to make electrical contact with the microelectronic workpiece;

a processing container including a plurality of nozzles angularly disposed in a sidewall of a principal fluid flow chamber at a level within the principal fluid flow chamber below a surface of a bath of processing fluid normally contained therein during immersion processing;

a plurality of individually operable electrical conductors disposed in the principal fluid flow chamber and positioned for electrical contact with the processing fluid.

38. (Original) A reactor as claimed in claim 37 and further comprising an electrode disposed at a lower portion of the processing container to provide electrical contact between an electrical power supply and the processing fluid.

39. (Original) A reactor as claimed in claim 38 wherein the processing container is defined at an upper portion thereof by an angled wall, the processing container further comprising at least one further electrode in fixed positional alignment with the angled wall to provide electrical contact between an electrical power supply and the processing fluid.

40. (Original) A reactor as claimed in claim 37 and further comprising a motor connected to rotate the workpiece support and an associated microelectronic workpiece at least during processing of the at least one surface of the microelectronic workpiece.

41.–63. (Canceled)